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ABSTRACT

Concerned with clarifying some of the more complex issues in drug abuse, the National Clearinghouse for Drug Abuse Information has prepared this special report on methylenedioxyamphetamine (MDA), commonly called Mellow Drug of America. Background information is provided through a summary of its history, legal status, and the opinions of authorities in the field. Significant research on the subject is presented together with major findings on various aspects of the problem. The pharmacology, chemistry, clinical effects (physiological, psychological, and subjective), and patterns of use of the drug are dealt with. Bibliographic references are also listed. (BL)

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report series

NATIONAL CLEARINGHOUSE FOR DRUG ABUSE INFORMATION

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The National Clearinghouse for Drug Abuse Information recognizes the need for clarifying some of the more complex issues in drug abuse by gathering the significant research findings on each subject and developing fact sheets on the problem. These fact sheets, which are part of the Clearinghouse Report Series, present information about treatment modalities, the pharmacology and chemistry of the various drugs of abuse, and opinions and practices of recognized authorities in the field. This publication was researched and written by James R. Gamage and E. Lief Zerkin of the Student Association for the Study of Hallucinogens (STASH), Beloit, Wisconsin, under Contract No. HSM-42-72-231.

MDA

Although MDA, ("Mellow Drug of America"), the so-called "love drug," has received considerable attention and notoriety on the "street," it has unfortunately received little attention or recognition in the laboratory. There are numerous gaps in our knowledge about this drug and its effects. A review of the limited information now available can only suggest the potential benefits and dangers of MDA; no conclusions can be made.

History, Chemistry and Pharmacology

MDA (3,4-methylenedioxyamphetamine) was first synthesized in the 1930's and is chemically related to both mescaline and amphetamine. Several "psychotomimetic amphetamines" have been developed by the addition of various substances to the phenyl ring of the basic amphetamine molecule. These substances, which vary in hallucinogenic activity, include MDA, DOM (STP), MMDA, and TMA.

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MDA is classified as an hallucinogen; however, some investigators have found the drug to possess some stimulant and minor sympathomimetic properties. Cook and Fellows (1962) hypothesized that because of its structural similarity to amphetamine MDA possessed a favorable therapeutic index as an anoretic (appetite suppressant). However, in clinical trials obese patients receiving

oral doses of MDA up to 120 milligrams (mg.) daily only experienced unpleasant central nervous system effects without the anticipated loss of appetite. Mann and Quastel (1940) found methylenedioxyamphetamine (MDA), like amphetamine, to be an active inhibitor of monoamine oxidase (MAO).

Studies by Gunn et al. (1939) determined the minimum lethal dose in mice by intraperitoneal (i.p.) injection to be 120 milligrams per kilogram (mg./kg.). In a more recent study, Richards and Borgstedt (1971) determined an LD-50 (i.e., that dose which kills 50 percent of an animal population) in mice to be 75 mg./kg. following i.p. administration. However, since only six mice were used in their study, the results can only be considered preliminary.

Physiological Effects

In the first human investigation with MDA, Loman et al. (1941) administered the drug in an unspecified dosage to a single patient with Parkinson's disease. An increase in muscular rigidity was observed. Beniecki and Muszynski (1953) noted that MDA produced a marked stimulatory effect on the respiratory centers similar to that exhibited by typical analeptic agents (stimulant drugs). In a study of spontaneous electrical activity in the brain of the unanesthetized cat, Fairchild et al. (1967) found MDA to possess more potent hallucinogenic activity than mescaline at equal doses. This appears consistent with the findings of Alles (1959) who experienced hallucinogenic phenomena with MDA at a dose four to five times less than would be required with mescaline.

The only visible physical effect seen consistently in humans receiving MDA is mydriasis (dilated pupils).

Psychological Effects

Naranjo, Shulgin and Sargent (1967) administered MDA orally to eight volunteers in a supportive clinical setting. All eight had previously experienced the effects of LSD under comparable conditions. Four of the eight volunteers received 150 mg. of the drug individually; one married couple had each partner receiving 150 mg.; and another married couple had each partner receiving 40 mg. with one partner being given an additional 40 mg. after the first hour. Effects of the drug were noted between 40 and 60 minutes following ingestion by all eight subjects. The subjective effects peaked at the end of 1½ hours, and the effects persisted for approximately 8 hours.

In spite of the researchers' expectations that MDA had a "potential for producing changes in affective mood and mild depersonalization," as well as visual distortion, none of the eight subjects reported hallucinations, perceptual distortions, or closed-eye imagery, all of which are common reactions to LSD, psilocybin or

mescaline. Yet these investigators have reported a similarity between MDA and LSD. Their subjects stated that both drugs had brought about an intensification of feelings, increased perceptions of self-insight, and heightened empathy with others during the experience. Most of the subjects also reported an increased sense of aesthetic enjoyment at some point during the intoxication. In addition, seven of the eight subjects reported that music was perceived with "three-dimensionalty," as is often reported with other hallucinogens.

Both married women exhibited amnesia for some episodes in the sessions. However, the amnesia appeared to be temporary; and with the assistance of a therapist, most of the session could be recalled a few days later.

Naranjo, Shulgin and Sargent (1967) concluded that MDA, to a certain extent, is in a class by itself and suggested investigating the possibility (since the drug produces an "inward, talky experience") that it might be of value in the facilitation of psychotherapy. In some initial observations of patients with psychoneurotic symptoms receiving MDA, the authors found a 50 percent frequency of spontaneous reminiscence of childhood events with almost no symbolic content, and without the aesthetic or mystical overtones that are so characteristic of most hallucinogens. In many of the subjects there was a type of amnesia, similar to that seen following emergence from a hypnotic trance after their experience with MDA. Delirium was experienced by two of the thirty patients, and in one there was erratic behavior, none of which was remembered afterwards. The experience was notable for the absence of visual distortions and color effects.

Subjective Effects

In general, MDA produces a sense of physical well being with heightened tactile sensations. The MDA experience is usually devoid of visual and auditory distortions which mark the LSD experience. People under the influence of MDA often focus on interpersonal relationships and demonstrate an overwhelming desire or need to be with and talk to other people. The most often reported unpleasant side effects are periodic tensing of muscles in the neck, tightening of the jaw and grinding of the back teeth.

Alles (1959) reported:

> To evaluate the effects of 3,4-methylenedioxyamphetamine, I took 0.4 mg./kg. of the hydrochloride by mouth. This was a total dosage of 36 mg. During the following 2 hours, I observed no noticeable change in blood pressure or heart rate, and, subjectively, I felt nothing comparable to the effects of amphetamine within the same period of time. Consequently, I raised the dosage and proceeded to take, after 2 hours, a dosage of 1 mg./kg., or a total of 90 mg. additionally. Within a few minutes, I realized that a notable subjective

response was going to result; I began to feel different quite promptly...

Forty-five minutes after the second dosage of the methylenedioxy-amphetamine salt, when I was seated in a room by myself, not smoking and where there was no possible source of smoke rings, an abundance of curling gray smoke rings was readily observed in the environment whenever a relaxed approach to subjective observation was used...

I found that now, too, I had a qualitatively different sensation in my finger tips. Then, as I tried stronger stimulation of the finger ends, I experienced a peculiar phenomenon that I had never noted before; nor have I noted it since, under any conditions. If you watch as you touch a table top with your finger, you will notice that the time when you hit it, as determined visually, and time when you feel it are in essential coincidence. However, under this drug, I found that I first hit the table and then felt it; the feeling was a very definitely delayed phenomenon.

As published accounts of the subjective effects of MDA are scarce, several individuals were interviewed who had taken the drug on one or more occasions with friends in non-clinical settings. The MDA experience was variously described as "a very pleasant body high," "more sensual than cerebral," and "much more empathic than inward." One individual described his experience as follows:

While under MDA I felt in complete control. There was no sense of loss of control as with other drugs such as acid (LSD). The predicament of surrendering to the drug's effects never presented itself. I felt incredibly in touch with my own feelings and those of others for the first time in many years. Following the experience, I found myself "rinsed out" and totally energized both physically and emotionally for the next few days.

Patterns of Use

MDA is produced illicitly and may appear in liquid form or as a powder (usually white) placed in a capsule or pressed into a tablet. The drug is usually taken orally, although it is occasionally "snorted" through the nose or injected intravenously. As with all street drugs, the dosage and quality of MDA varies greatly. Upon chemical analysis, MDA has been found to be adulterated, or "cut," with amphetamine, cocaine, LSD, and atropine. Often alleged "MDA" is found to contain a combination of LSD and amphetamine which results in an LSD experience for the first 6 to 8 hours followed by persistent amphetamine-like effects (e.g., restlessness, inability to sleep, anxiety).

In general, street doses of MDA range from 100 to 150 mg. per dose. Richards and Borgstedt (1971) reported that the ingestion of 500 mg. of pure MDA resulted in the hospitalization of three individuals due to physical complications. Meyers et al. (1967/1968) reported the occurrence of one human death in association with the use of MDA in combination with another drug; however, both the dose of MDA and nature of the other drug were unspecified.

The unpleasant MDA experience ("bad trip"), if it occurs, should be treated the same as adverse reactions to other hallucinogens. This involves "talking down" the individual in a warm, non-threatening environment by an empathetic person who is capable of conveying the individual to hospital facilities should it be required.

Legal Status

MDA (3,4-methylenedioxyamphetamine) is considered a controlled dangerous substance under the Comprehensive Drug Abuse Prevention and Control Act of 1970. Illegal possession of MDA could result in a sentence of a term of imprisonment for not more than one year, a fine of not more than $5,000, or both. A conviction for illicit manufacture or sale could result in a sentence of a term of imprisonment for not more than five years, a fine of not more than $15,000, or both. Subsequent convictions would result in increased penalties.

Comment

It is puzzling that so little is actually known about MDA considering the drug has sparked interest both on the street and in the laboratory:

> It is difficult to predict a future of the psychotomimetic amphetamines in general although MDA or methylenedioxy-amphetamine may potentially, at least, be the most important in the future. In April, 1970, an article in the Berkeley Barb, entitled "How to Turn Speed to Love," described MDA "as the new love drug which had been getting rave reviews in the Diggers Chamber of Commerce."
>
> --David E. Smith, M.D. (1969)

> On the whole, judging from the previous reports and from the results of the studies here, the effects of MDA appear to be sui generis: it affects the feelings in a way which is comparable to that observed with hallucinogens, but it does not bring about the perceptual phenomena, depersonalization, or disturbances of thought which characterize those substances. Further, there

is little evidence of the peripheral sympathomimetic effects of amphetamine. It is suggested therefore that this compound may be of value in the facilitation of psychotherapy, by virtue of its ability to enhance access to feelings and emotions without the distractions of sensory distortion.

--Claudio Naranjo, M.D. et al. (1967)

However, as this drug continues to be used, we need to know more:

Insofar as physical effects at high doses are concerned, we know very little. There are no accurate studies available of high dosage users of MDA. Although many other psychedelic agents are known to have been consumed in huge quantities, few, if any, deaths have been proven to have occurred as a result of their toxic effects on the body. The newspapers have frequently referred to deaths of this kind as being due to MDA, but this has not yet been proven. Research into the physical effects of MDA, including its toxicity at high doses, is needed.

--Robert N. Richards, M.D. (1971)

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